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**DATA SHEET**

**PART NO.: L-T670WDT**

**REV: B / 1**

CUSTOMER'S APPROVAL : \_\_\_\_\_

DCC : \_\_\_\_\_

DRAWING NO. : DS-7A-06-0001

DATE : 2015-1-6

PAGE

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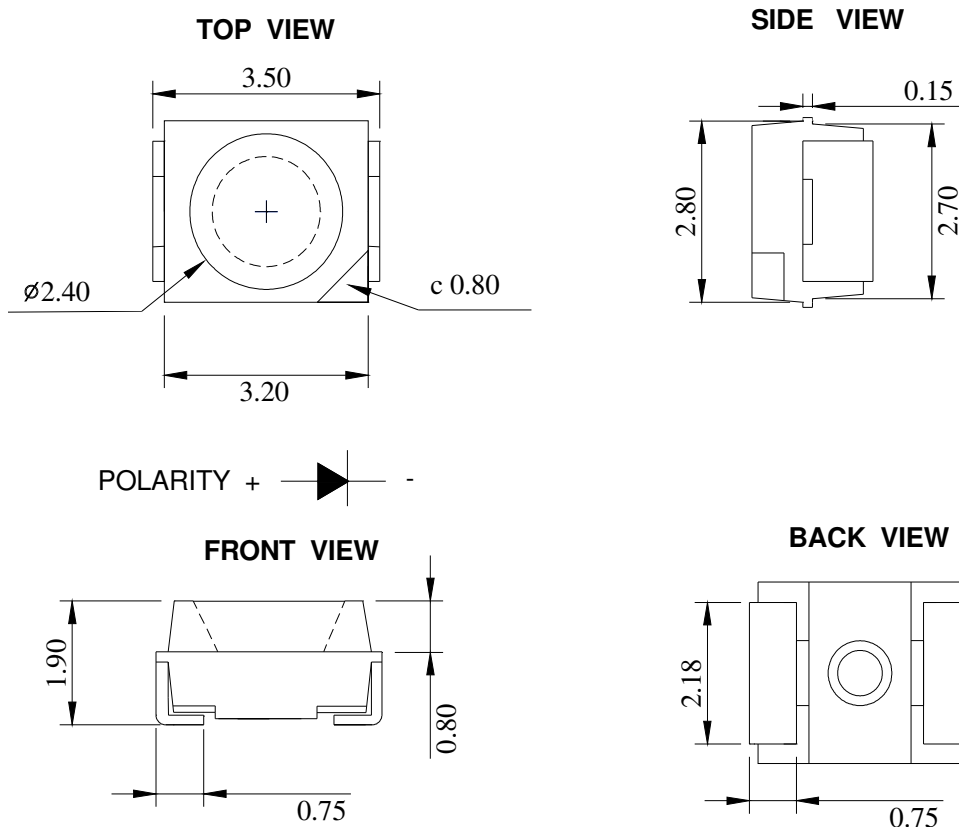
● Features

- \* Top view, Wide view angle, White color PLCC 2 package SMD LED .
- \* EIA STD package, packing in 8mm tape on 7" diameter reels (ANSI/EIA-481-B-2001).
- \* Compatible with automatic Pick & Place equipment.
- \* Compatible with IR Reflow soldering and TTW soldering.
- \* Pb free product and acceptable lead-free process.
- \* Meet RoHS Green Product.

● Application

- \* Backlighting (LCD, Switches, keys, displays, illuminated advertising)
- \* Emergency lighting / Signal and symbol luminaries.

● Package Outline Dimensions



Notes:

1. All dimensions are in millimeters.
2. Tolerance is  $\pm 0.10\text{mm}$  (.004") unless otherwise noted.



# SURFACE MOUNT DEVICE LED

Part No. : L-T670WDT

REV: B / 1

## ● Chip Materials

- \* Dice Material : InGaN
- \* Light Color : White
- \* Lens Color : Light Yellow Diffused.

## ● Absolute Maximum Ratings(Ta=25°C)

Symbol	Parameter	Rating	Unit
PD	Power Dissipation	100	mW
IPF	Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	100	mA
IF	Continuous Forward Current	25	mA
VR	Reverse Voltage	5	V
ESD	Electrostatic Discharge Threshold (HBM) <sup>Note A</sup>	1000	V
Topr	Operating Temperature Range	-40 ~ + 85	°C
Tstg	Storage Temperature Range	-40 ~ + 85	°C

Note A :

HBM : Human Body Model. Seller gives no other assurances regarding the ability of to withstand ESD.

## ● Electro-Optical Characteristics (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity	IV	1550	2000		mcd	IF=20mA
Viewing Angle	2 θ 1/2		120		Deg	Note 2
CIE Chromaticity	x		0.31			IF=20mA
CIE Chromaticity	y		0.32			
Forward Voltage	VF	2.8	3.20	3.50	V	IF = 20mA
Reverse Current	IR			10	μ A	VR = 5V

Notes:

1. Luminous intensity is measured with a light sensor and filter combination that proximates the CIE eye-response curve.
2.  $\theta$  1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. Caution in ESD :  
Static Electricity and surge damages the LED. It is recommended use a wrist band or anti-electrostatic glove when handling the LED. All devices, equipment and machinery must be properly grounded.
4. Major standard testing equipment by “Instrument System” Model : CAS140B Compact Array Spectrometer and “KEITHLEY” Source Meter Model : 2400.

● Typical Electro-Optical Characteristics Curves

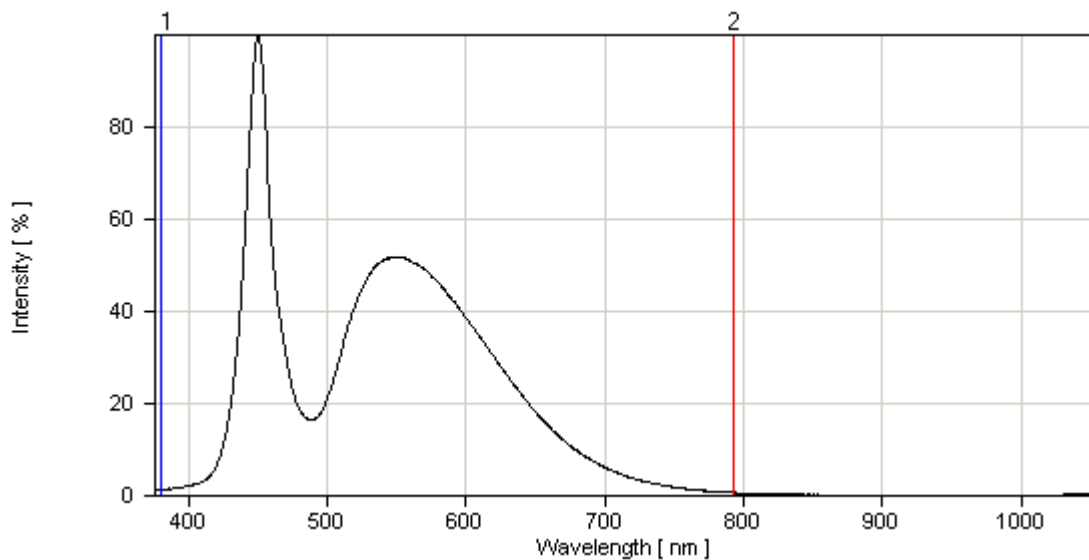


Fig.1 Relative Intensity vs. Wavelength

### ● Typical Electro-Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)

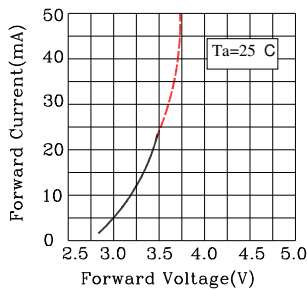


Fig.1 Forward Current vs. Forward Voltage

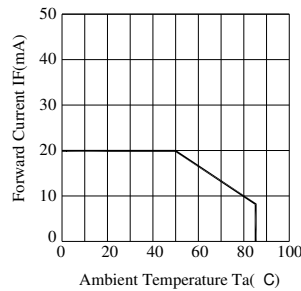


Fig.2 Forward Current Derating Curve

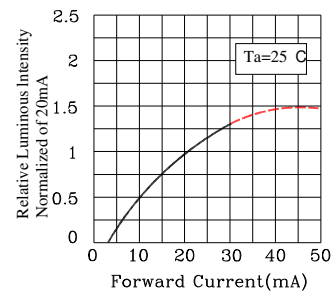


Fig.3 Relative Luminous Intensity vs. Forward Current

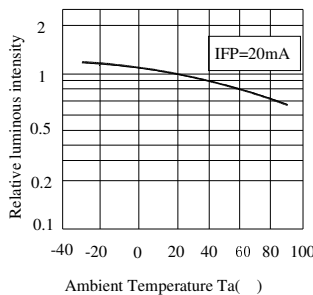


Fig.4 Luminous Intensity vs. Ambient Temperature

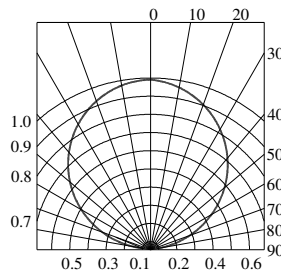


Fig.5 Spatial Distribution

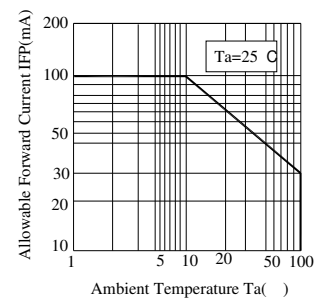


Fig.6 Forward Current Derating Curve

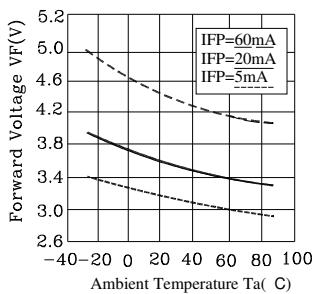


Fig.7 Ambient Temperature vs. Forward Voltage

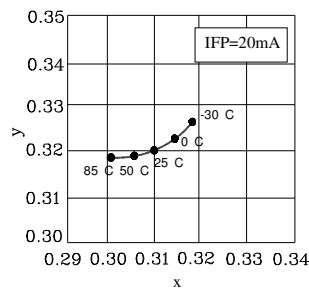


Fig.8 Ambient Temperature vs. Chromaticity Coordinate

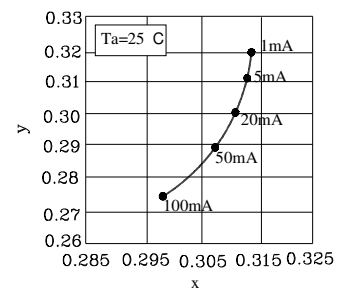


Fig.9 Forward Current vs. Chromaticity Coordinate



# SURFACE MOUNT DEVICE LED

Part No. : L-T670WDT

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## ● Bin Code List

Luminous Intensity(IV),Unit:mcd@20mA					
Iv bin code(main code)			Iv bin code(sub code-2)		
Bin Code	MIN	Max	Bin Code	MIN	Max
P24	1550	1900	H13	1550	1700
P25	1900	2350	H14	1700	1900
P26	2350	2600	H15	1900	2100
			H16	2100	2350
			H17	2350	2600

Forward Voltage(VF), Unit:V@20mA		
Bin Code	MIN	Max
13	2.8	2.9
14	2.9	3.0
15	3.00	3.10
16	3.10	3.20
17	3.20	3.30
18	3.30	3.40

Tolerance of each bin are  $\pm 10\%$

Tolerance of each bin are  $\pm 0.1$  Volt



# SURFACE MOUNT DEVICE LED

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Color Rank (CIE chromaticity x , y) @ 20mA

Rank a31				
x	0.270	0.264	0.275	0.279
y	0.260	0.267	0.281	0.276
Rank a32				
x	0.279	0.275	0.287	0.290
y	0.276	0.281	0.295	0.288
Rank a33				
x	0.288	0.279	0.290	0.296
y	0.264	0.276	0.288	0.276
Rank a34				
x	0.280	0.270	0.279	0.288
y	0.250	0.260	0.276	0.264

Rank b61				
x	0.308	0.307	0.318	0.319
y	0.308	0.315	0.326	0.318
Rank b62				
x	0.319	0.318	0.330	0.330
y	0.318	0.326	0.339	0.330
Rank b63				
x	0.320	0.319	0.330	0.330
y	0.305	0.318	0.330	0.318
Rank b64				
x	0.311	0.308	0.319	0.320
y	0.294	0.308	0.318	0.305

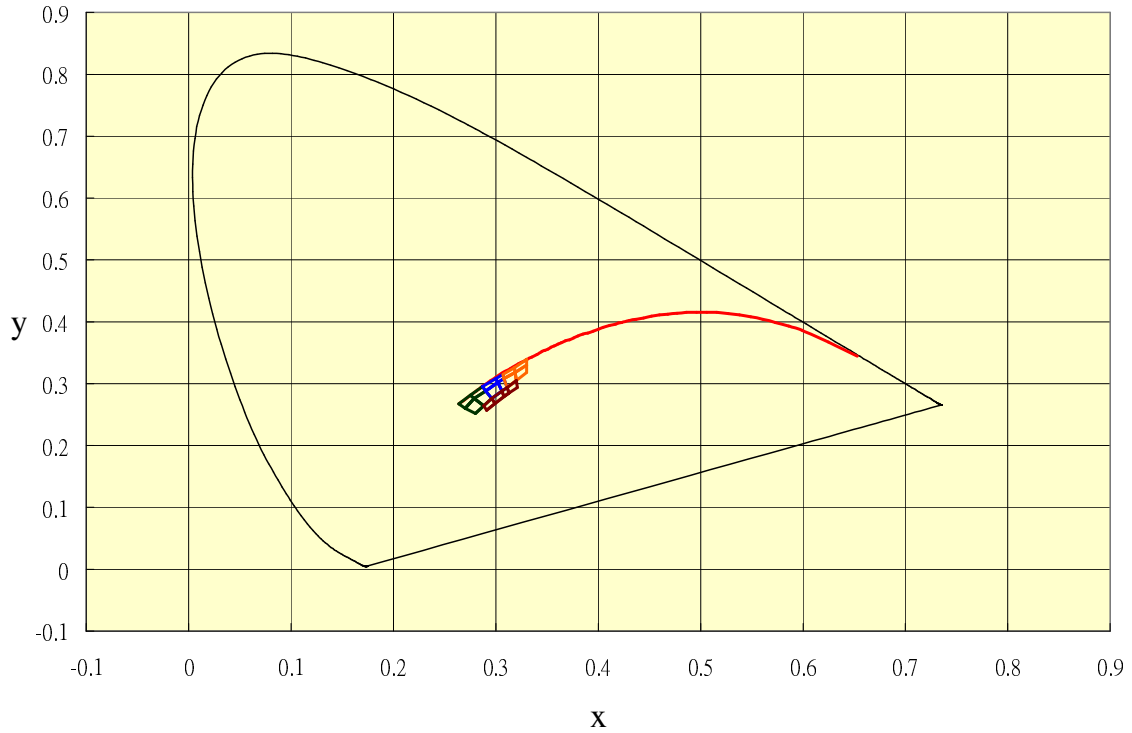
Rank b51				
x	0.290	0.287	0.300	0.302
y	0.288	0.295	0.308	0.302
Rank b52				
x	0.302	0.300	0.307	0.308
y	0.302	0.308	0.315	0.308
Rank b53				
x	0.306	0.302	0.308	0.311
y	0.288	0.302	0.308	0.294
Rank b54				
x	0.296	0.290	0.302	0.306
y	0.276	0.288	0.302	0.288

Rank b73				
x	0.299	0.296	0.306	0.308
y	0.268	0.276	0.288	0.279
Rank b74				
x	0.291	0.288	0.296	0.299
y	0.257	0.264	0.276	0.268
Rank b83				
x	0.313	0.311	0.320	0.321
y	0.285	0.294	0.305	0.294
Rank b84				
x	0.308	0.306	0.311	0.313
y	0.279	0.288	0.294	0.285

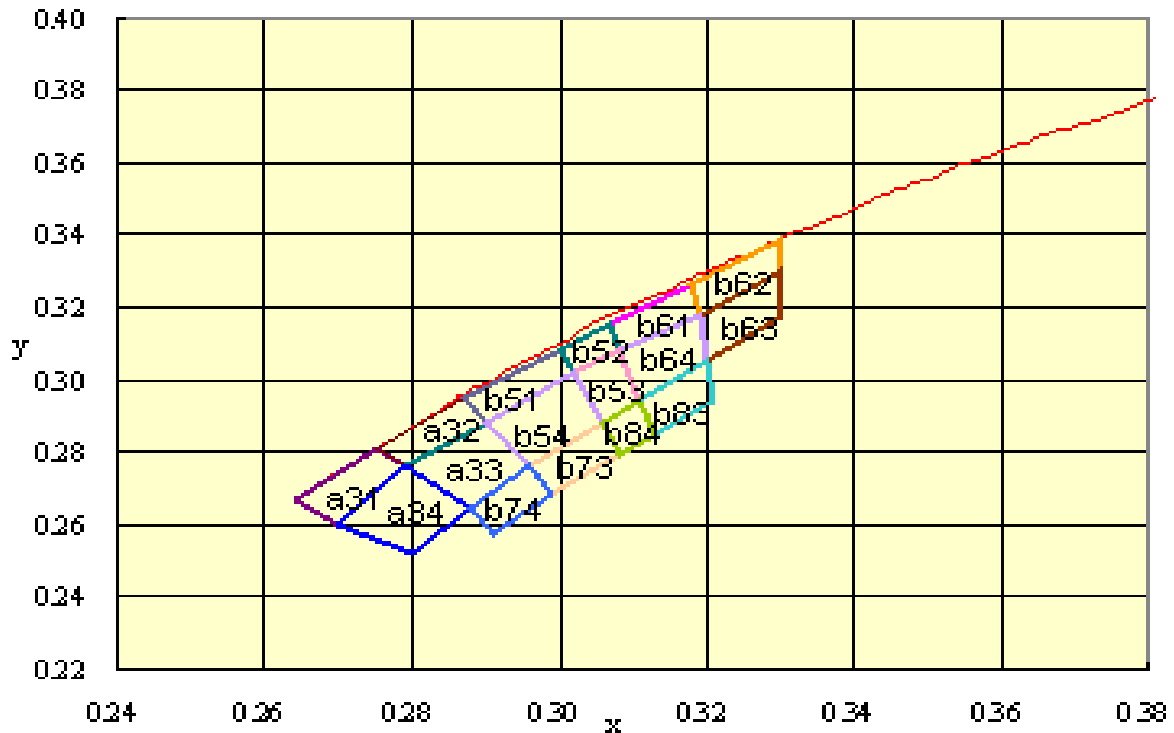
\* Measurement of Color coordinates : +/- 0.01

• C.I.E Chromaticity Diagram

**C.I.E. 1931 Chromaticity Diagram**



**C.I.E. Chromaticity Diagram**





## ● Label Explanation



CUS. PART NO: To be denominated.

CUSTOMER: To be denominated.

PART NO: Refer to P17

IV--- Luminous Intensity Code

VF--- Forward Voltage Code

CIE--- Color Rank Code

LOT NO:   E  L  P  6  8  0001    
          A    B    C    D    E    F

A---E: For series number

B---L: Local    F: Foreign

C---P: PLCC SMD

D---Year

E---Month

F---SPEC.

PACKING QUANTITY OF BAG :

2000pcs for T670 series

2000pcs for T650 series

2000pcs for S020 series

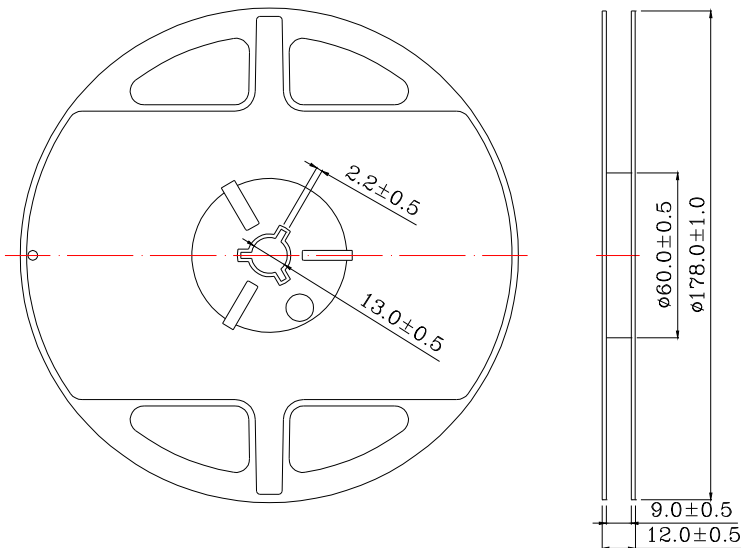
DATE CODE:   2006     06     08    
                  G    H    I

G--- Year

H--- Month

I --- Day

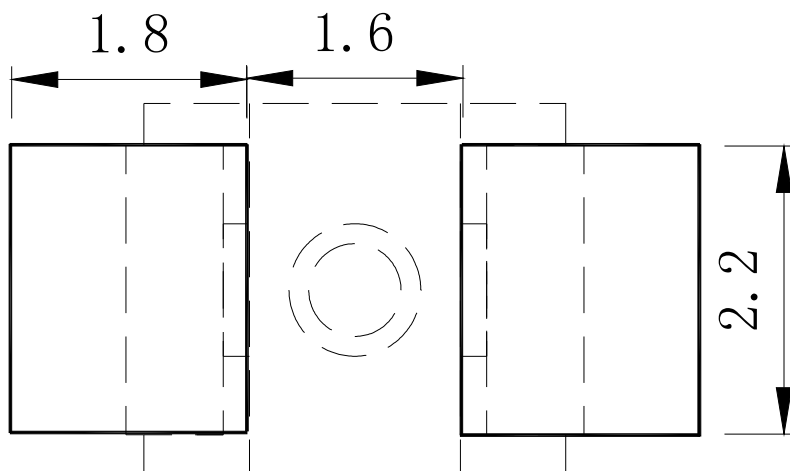
## ● Reel Dimensions



## Notes:

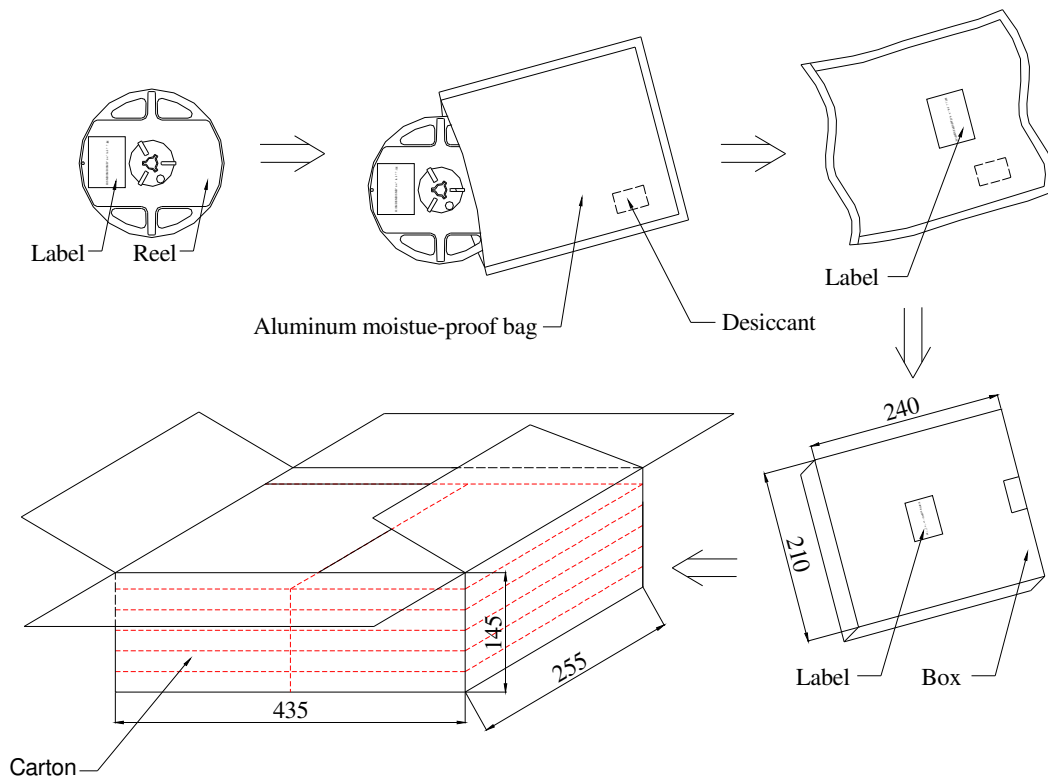
1. Taping Quantity : 2000pcs
2. The tolerances unless noted is  $\pm 0.1\text{mm}$ , Angle  $\pm 0.5^\circ$  , Unit: mm.

## ● Suggest Soldering Pad Dimensions





● Moisture Resistant Packaging

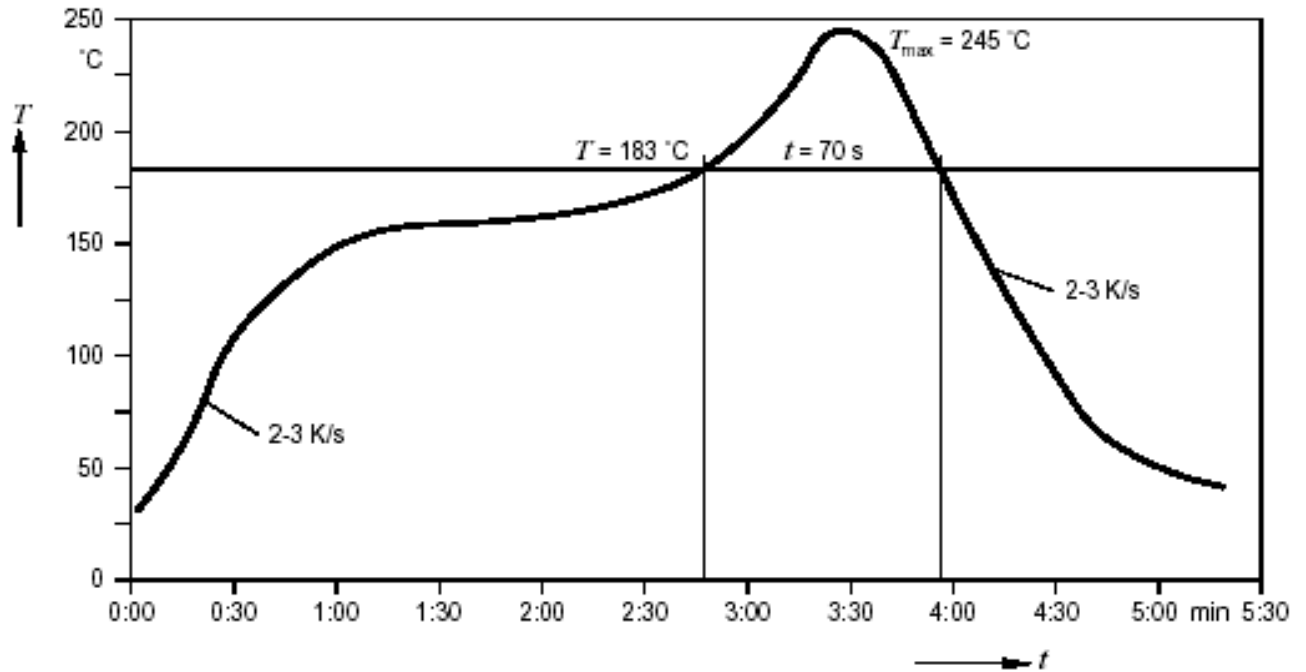


Notes : One reel in a bag, one bag in a inner box, ten inner boxes in a carton. Unit : mm.

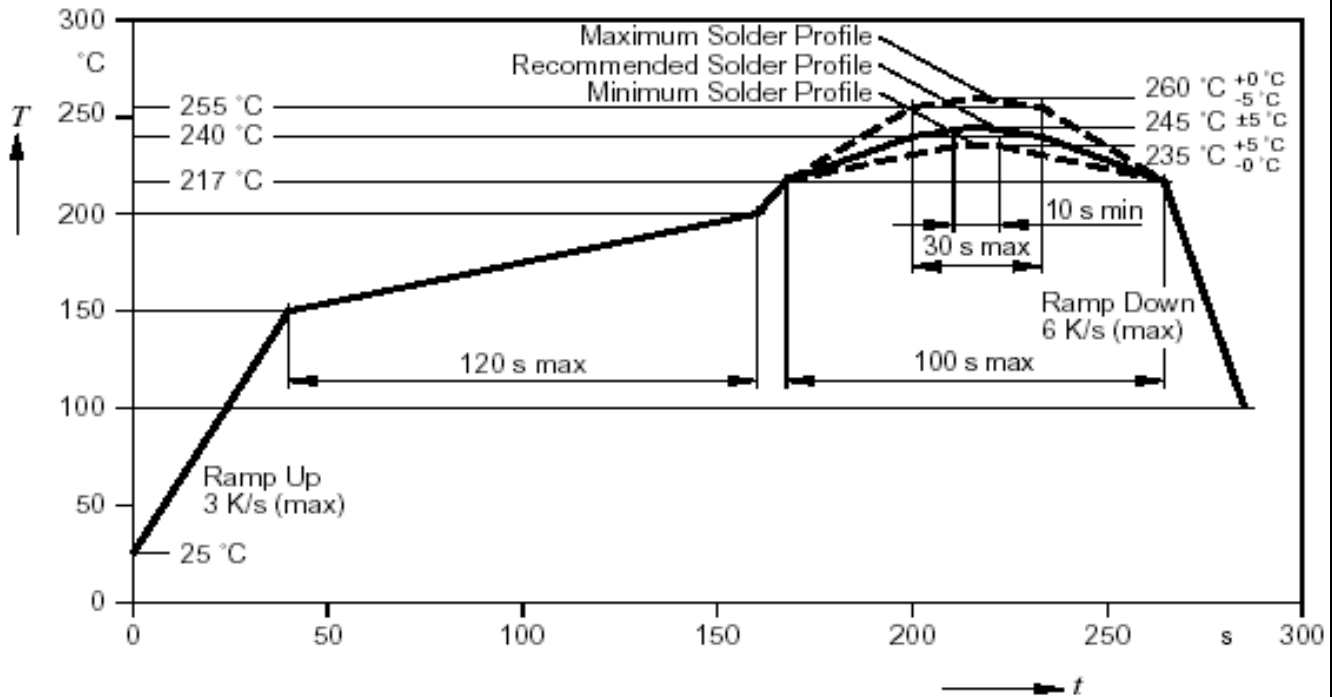
● Cleaning

- \* If cleaning is required , use the following solutions for less than 1 minute and less than 40°C .
- \* Appropriate chemicals: isopropyl alcohol. (When using other solvents, it should be confirmed beforehand whether the solvents will dissolve the package and the resin or not.)
- \* Effect of ultrasonic cleaning on the LED resin body differs depending on such factors as ultrasonic power and the assembled condition. Before cleaning, a pre-test should be confirm whether any damage to the LEDS will occur.

● Suggest Sn/Pb IR Reflow Soldering Profile Condition:



● Suggest Pb-Free IR Reflow Soldering Profile Condition:



## ● CAUTIONS

### 1. Static Electricity:

- \* Static electricity or surge voltage damages the LEDs.

It is recommended that a wrist band or an anti-electrostatic glove be used when handling the LEDs.

- \* All devices, equipment and machinery must be properly grounded.

It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.

- \* When inspecting the final products in which LEDs were assembled, it is recommended to check whether the assembled LEDs are damaged by static electricity or not. It is easy to find static-damaged LEDs by a light-on test or a VF test at a lower current (blew 1mA is recommended).

\* Damaged LEDs will show some unusual characteristics such as the leak current remarkably increases, the forward voltage becomes lower, or the LEDs do not light at the low current.

Criteria: (VF>2.0V, at IF=0.5mA)

### 2. Storage :

- \* Before opening the package :

The LEDs should be kept at 30°C or less and 85%RH or less. When storing the LEDs, moisture proof packaging with absorbent material (silica gel) is recommended.

- \* After opening the package :

The LEDs should be kept at 30°C or less and 70%RH or less. The LEDs should be soldered within 168 hours (7 days) after opening the package. If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with packages of moisture absorbent material (silica gel). It is also recommended to return the LEDs to the original moisture proof bag and to reseal the moisture proof bag again.

If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment: more than 24hours at 65±5°C.

- \* Please avoid rapid transitions in ambient temperature in high humidity environments where condensation may occur.

### 3. Soldering:

Do not apply any stress to the LED lens during soldering while the LED is at high temperature.

Recommended soldering condition.

- \* Reflow Soldering :

Pre-heat 120~150°C, 120sec. MAX., Peak temperature : 240°C Max. Soldering time : 10 sec Max.

- \* Soldering Iron : (Not recommended)

Temperature 350°C Max., Soldering time : 3 sec. Max.(one time only), power dissipation of iron :

20W Max. use SN60 solder of solder with silver content and don't touch LED lens when soldering.

**4. Lead-Free Soldering**

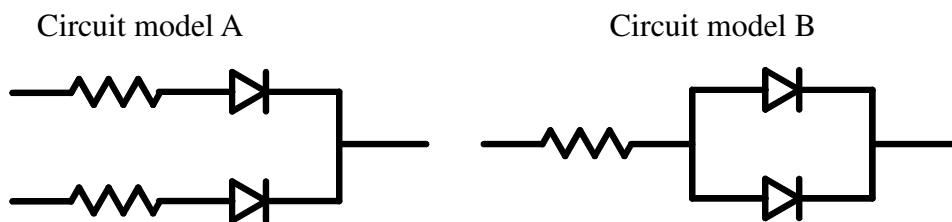
For Reflow Soldering :

- 1、Pre-Heat Temp: 150-180°C ,120sec.Max.
- 2、Soldering Temp: Temperature Of Soldering Pot Over 240°C ,40sec.Max.
- 3、Peak Temperature: 260°C , 10sec.
- 4、Reflow Repetition: 2 Times Max.
- 5、Suggest Solder Paste Formula : 93.3 Sn/3.1 Ag/3.1 Bi/0.5 Cu

For Soldering Iron (Not Recommended) :

- 1、Iron Tip Temp: 350°C Max.
- 2、Soldering Iron: 30w Max.
- 3、Soldering Time: 3 Sec. Max. One Time.

**5. Drive Method**



(A)Recommended circuit.

(B)The difference of brightness between LED`s could be found due to the Vf-If characteristics of LED.

**6. Reliability**

1、Criteria For Judging The Damage

Item	Symbol	Test Conditions	Criteria for Judgement	
			MIN.	Max.
Forward Voltage	VF	IF=20mA	-	U.S.L.*)×1.1
Reverse Current	IR	VR=5V	-	U.S.L.*)×2.0
Luminous Intensity	IV	IF=20mA	L.S.L**)×0.7	-

\*) U.S.L.: Upper Standard Level

\*\*) L.S.L: Lower Standard Level



# SURFACE MOUNT DEVICE LED

Part No. : L-T670WDT

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## 2、 Test Items And Results

Test Item	Reference Standard	Test Condition	Note	Number of Damaged
Resistance to Soldering Heat (Reflow Soldering)	JEITA ED-4701300 301	Tsld=260°C,10sec. (Pre treatment 30 °C,70%,168hrs)	2times	0/50
Thermal Shock	JEITA ED-4701300 307	-40°C ~ 100°C 30min. 30min.	100cycles	0/50
Temperature Cycle	JEITA ED-4701100 105	-40°C ~ 25°C~100°C~25°C 30min. 5min. 30min. 5min	100cycles	0/50
High Temperature Storage	JEITA ED-4701200-201	Ta=100°C	1000hrs.	0/50
Temperature Humidity Storage	JEITA ED-4701100 103	Ta=60°C ,RH=90%	1000hrs.	0/50
Low Temperature Storage	JEITA ED-4701200 202	Ta=-40°C	1000hrs.	0/50
Steady State Operating Life Condition		Ta=25°C ,IF=20mA	1000hrs.	0/50
Steady State Operating Life of High Humidity Heat		Ta=60°C ,RH=90% ,IF=15mA	500hrs.	0/50
Steady State Operating Life of Low Temperature		Ta=-30°C ,IF=20mA	500hrs.	0/50

## 7.Others:

The appearance and specifications of the product may be modified for improvement without notice.





# SURFACE MOUNT DEVICE LED

Part No. : L-T670WDT

REV: B / 1

● PART NO. SYSTEM :

L - T 670 X X T - X X X X

XXXX : Special specification for customer

T : Taping for 7 inch reel  
TC : Taping for 13 inch reel

Lens color  
C : Water Clear  
W : White Diffused  
T : Color Transparent  
D : Color Diffused

KY : 9mil AlInGap 590nm Super Yellow  
KR : 9mil AlInGap 630 nm Super Red  
TE : 14mil AlInGap 624 nm Super Red  
TY: 14mil AlInGap590 nm Super Yellow  
LB : InGaN ITO rough 470nm Blue  
LG : InGaN ITO rough520nm Green  
W : InGaN + YAG White color

0 : Single chip  
1/2 : Super thin single chip  
5/6 : Dual chip  
F : Three chip(Full color)

650 : 3020 1.3T TYPE  
670 : 3528 1.9T TYPE  
020 : 3812 0.6T TYPE

C : PCB Top View Type  
T : PLCC Top View Type  
S : Side View Type

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